source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the borophosphosilicate layer.

31. (Amended) A method of depositing a silicon dioxide layer on a substrate surface, the method comprising:

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor and ozone;

heating the substrate surface to a temperature of at least 480°C to about 700°C; and

illuminating the reaction volume of gas from a light source without directly exposing the substrate surface to the light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than in homogeneous reactions taking place in the chamber outside of the reaction volume, subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

42. (Amended) A method of depositing a doped silicon dioxide layer on a substrate surface, the method comprising:

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor, ozone and at least one dopant source;

heating the substrate surface to a temperature of at least 480°C to about 700°C; and

illuminating the reaction volume of gas from a light source without directly exposing the substrate surface to the light source to increase the functional atomic oxygen

concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

43. (Amended) A method of depositing a doped silicon dioxide layer on a substrate surface, comprising:

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor, ozone and at least two dopant sources;

heating the substrate surface to a temperature of at least 480°C to about 700°C; and

illuminating the reaction volume of gas from a light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

45. (Amended) A method of depositing a borophosphosilicate glass layer on a substrate surface, comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, wherein the reaction volume of gas comprises:

a SiO_2 precursor selected from the group consisting of TEOS (tetraethylorthosilicate), TMCTS (tetramethylcyclotetrasiloxane), DES (diethylsilane), DTBS (ditertiarybutylsilane) and TMOS

(tetramethylorthosilicate);

a dopant source for boron selected from the group consisting of triisopropylborate, TMB (trimethylborate), and TEB (triethylborate); and

a dopant source for phosphorus selected from the group consisting of TEPo (triethylphosphate), TEPi (triethylphosphite), TMPo (trimethylphosphate) and TMPi (trimethylphosphite);

illuminating the reaction volume of gas from a high intensity light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

46. (Amended) A method of depositing a fluorosilicate glass layer on a substrate surface, comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a fluorinated SiO_2 precursor and ozone; and

illuminating the reaction volume of gas from a light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume take part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the fluorosilicate layer.

47. (Amended) A method of depositing a doped fluorosilicate glass layer on a substrate surface, the method comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a fluorinated SiO_2 precursor, ozone and at least one dopant source; and

illuminating the reaction volume of gas from a light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

48. (Amended) A method of depositing a doped fluorosilicate glass layer on a substrate surface, the method comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a fluorinated SiO_2 precursor, ozone and at least two dopant sources; and

illuminating the reaction volume of gas from a high-intensity light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the fluorosilicate layer.

50. (Amended) A method of depositing a fluoroborophosphosilicate glass layer on a substrate surface, the method comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, wherein the reaction volume of gas comprises:

a SiO_2 precursor comprising FTES (fluorotriethoxysilane);

a dopant source for boron selected from the group consisting of triisopropylborate, TMB (trimethylborate), and TEB (triethylborate); and

a dopant source for phosphorus selected from the group consisting of TEPo (triethylphosphate), TEPi (triethylphosphite), TMPo (trimethylphosphate) and TMPi (trimethylphosphite); and

illuminating the reaction volume of gas from a high intensity light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the fluoroborophosphosilicate layer.

51. (Amended) A method of depositing a silicon dioxide layer on a substrate surface, the method comprising:

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor and ozone;

heating the substrate surface to a temperature of at least 480°C to about 700°C; and

illuminating the reaction volume of gas from a light source comprising mercury arc vapor lamps without directly exposing the substrate surface to the light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr

during deposition of the silicon dioxide layer.

52. (Amended) A method of depositing a doped silicon dioxide layer on a substrate surface, the method comprising:

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor, ozone and at least one dopant source;

heating the substrate surface to a temperature of at least 480°C to about 700°C; and

illuminating the reaction volume of gas from a light source comprising mercury arc vapor lamps without directly exposing the substrate surface to the light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.

53. (Amended) A method of depositing a doped silicon dioxide layer on a substrate surface, the method comprising:

heating the substrate surface to a temperature of at least 480°C to about 700°C;

contacting the substrate surface with a reaction volume of gas located above the substrate surface within a chemically reactive distance of the substrate, the reaction volume of gas comprising a SiO_2 precursor, ozone and at least two dopant sources; and

illuminating the reaction volume of gas from a light source comprising mercury arc vapor lamps to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume; and

subjecting the reaction volume of gas to a pressure of approximately 200 to 760 torr during deposition of the silicon dioxide layer.